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### Company Reports

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## Upcoming Events

November 6, 2012 @ 9:00AM ET  
Fuel Tech Reports 3Q12 Results

November 14-15, 2012

### **Power Experts Conference**

Marriott Downtown

Atlanta, GA

December 11-13, 2012

### **POWER-GEN International**

Orange County Convention Center

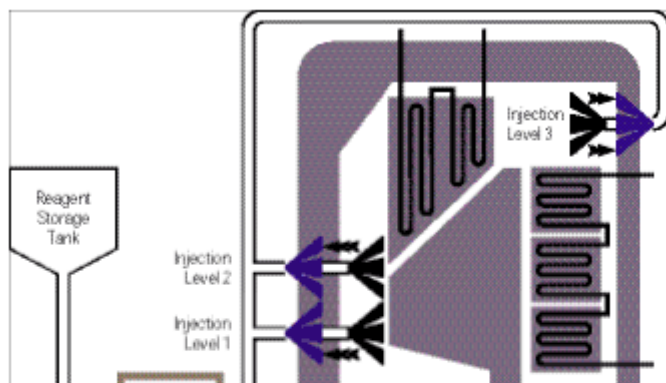
Orlando, FL

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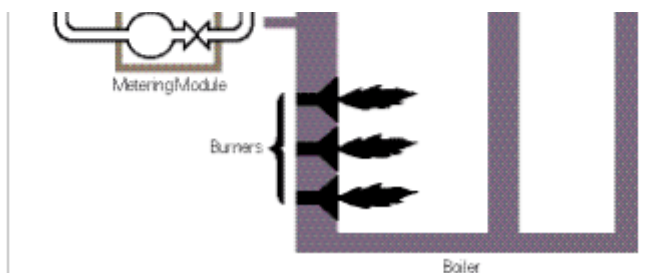
## SNCR Systems - NO<sub>x</sub>OUT® and HERT™

- Urea-based Selective Non-Catalytic Reduction (SNCR)
- 25% - 50% NO<sub>x</sub> Reduction
- Over 520 Installations Worldwide



### NO<sub>x</sub>OUT® SNCR Process

The NO<sub>x</sub>OUT® SNCR Process is a urea-based Selective Non-Catalytic Reduction (SNCR) process for reduction of oxides of nitrogen (NO<sub>x</sub>) from stationary combustion sources. The process requires precisely engineered injection of stabilized urea liquor into



combustion flue gas temperatures as high as 2500° F. Fuel Tech customizes the design and injection strategy for each application since most NO<sub>x</sub> reduction occurs in a temperature range between 1650° F - 2100° F. As shown in the diagram, the injection is typically

multi-level and controlled automatically to adjust urea injection in response to boiler load changes and changing furnace conditions.

### HERT™ High Energy Reagent Technology™ SNCR System

The HERT™ System uses a high energy injection strategy to inject urea into the furnace. Depending on the specifics of each application, the injection can be through the over-fire air or by using a dedicated air stream provided by a small, separate blower skid. The HERT™ systems have met NO<sub>x</sub> reductions guarantees on commercial installations while minimizing ammonia slip with this patented injection process.

The SNCR systems provided by Fuel Tech may include NO<sub>x</sub>OUT® injectors along with HERT™ System Injection technology, using the same urea storage, handling and control components. Fuel Tech's SNCR applications rely heavily on the use of [Computational Fluid Dynamics](#) (CFD) models and [Chemical Kinetics Modeling](#) and their resulting visualization utilizing proprietary software. Our NO<sub>x</sub>OUT SNCR technology is sufficiently flexible to apply to a variety of commercial and process combustion units, as detailed below.

NO <sub>x</sub> OUT® Process Injection	SNCR Technology	HERT™ High Energy Reagent Technology Injections
<ul style="list-style-type: none"> <li>• High momentum injectors</li> <li>• Maximize performance</li> <li>• Adjustable for NO<sub>x</sub> reduction downstream of injection point</li> </ul>	<ul style="list-style-type: none"> <li>• CFD/CKM Modeling</li> <li>• Reliable equipment</li> <li>• On-site optimization</li> </ul>	<ul style="list-style-type: none"> <li>• High energy, low momentum injectors</li> <li>• Maximize performance with minimal ammonia slip</li> <li>• Localized NO<sub>x</sub> reduction</li> </ul>

#### Fuels

- Coal
- Lignite
- Oil
- Gas
- Municipal Solid Waste
  - Sludge
  - Wood
  - Biomass
  - Refinery/CO Gas

#### Process Combustion Units Commercial Combustion Units

- Cement Kilns
- Glass Furnaces
- Ethylene Furnaces
  - Calciners
  - Coke Ovens
  - Lime Kilns

- Tangentially-Fired Utility Boilers
- Cyclone-Fired Utility Boilers
- Wall-Fired Utility Boilers (wet & dry)
- Refinery Crude Heaters and CO Boilers
- Sludge Combustors
- Industrial Power Boilers
- Municipal Waste

- Combustors
- Incinerators
- Circulating Fluidized Bed Boilers
- Stoker-Fired Boilers Burning Wood and Coal
- Package Boilers

From a compliance standpoint, the NO<sub>x</sub>OUT® process has been used to satisfy Best Available Control Technology (BACT) requirements for Municipal Solid Waste combustors, coal-fired Independent Power Producer (IPP) units, and fluidized bed boilers. The SNCR process has been used to comply with Reasonably Available Control Technology (RACT) requirements in ozone non-attainment areas and Administrative Compliance Orders in specific

locales.

A primary feature of the NO<sub>x</sub>OUT® and HERT™ processes is the ease of combination with other NO<sub>x</sub> reduction technologies. Combinations that have been retrofit with the NO<sub>x</sub>OUT® process are low NO<sub>x</sub> burners, over-fire air, combustion tempering, neural network controls, and gas reburn. Fuel Tech's patented [ASCR™ Advanced SCR](#) process combines a variety of technologies to provide up to 80+% NO<sub>x</sub> reductions at a fraction of the cost of conventional SCR systems.

## **Related Documents**

[SNCR - NO<sub>x</sub>OUT® and HERT™ Systems Brochure](#)

[ASCR™ Brochure](#)

[The design and operation of an Advanced NO<sub>x</sub> Control System on 636TPD MWC at Lee County WTE Facility](#)  
[Presented at NAWTEC 2009](#)

[Demonstration of NO<sub>x</sub> Emissions Below 0.15lb/MBtu in a Cyclone Boiler Using In-Furnace NO<sub>x</sub> Control](#)

[NO<sub>x</sub> Control Technologies: Focus SNCR](#)  
[Presented at the Western Coal Council, Burning PRB Coal Seminar, 2001](#)

[First Installation of Selective Non-Catalytic NO<sub>x</sub> Reduction Process on Utility Boilers in Korea](#)  
[Presented at the U.S. EPA/DOE/EPRI Mega Symposium, 2001](#)

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